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Evaluation of the possibility for effort increase in eastern Nova Scotia Snow crab fishing Areas 23 and 24.

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ABSTRACT

In this paper, we discuss the determination of a traditional fishing zone as well as the pros and cons for introducing additional fishing effort in the outer zones of Areas 23 and 24 based on the additional results to those presented at the January 1998 Regional Assessment Process meeting. Three issues have been considered when determining the surface of traditional fishing grounds for snow crab 1) unweighted fishing effort distribution (presence/absence of logbook record within a 5° x 10° fishing grid) based on the historical logbook data, 2) weighted fishing effort distribution (fishing frequency-based within a 5° x 10° fishing grid) based on the logbook data, and 3) stock distribution (Biron *et al.*, 1998).

RÉSUMÉ

La délimitation d'une zone de pêche traditionnelle, ainsi que le pour et le contre d'une augmentation de l'effort de pêche dans les régions externes des zones 23 et 24 sont discutés dans ce document. Cette discussion est basée sur des données additionnelles de celles présentées à la réunion du Processus Régional d'Évaluation des Stock de janvier 1998. Trois issues ont été considérés lors de la délimitation d'une surface de pêche traditionnelle de crabe des neiges; 1) la distribution non-pondérée de l'effort de pêche (présence / absence d'effort de pêche à l'intérieur de quadrilatère de pêche de 5° x 10°, basée sur les données historiques des livres de bord), 2) la distribution pondérée de l'effort de pêche (fréquence de pêche à l'intérieur de quadrilatère de pêche de 5° x 10°, basée sur les données historiques des livres de bord), et 3) la distribution du stock (Biron *et al.*, 1998).

INTRODUCTION

The 1998 Regional Assessment Process (RAP) meeting on the eastern Nova Scotian snow crab fisheries was held in January in Moncton, N.B. The results of the trawl survey and the 1997 fishery data analyses were examined at the session and a scientific committee provided the following observations and advice for Areas 23 and 24 (Anonymous, 1998; Biron *et al.*, 1998):

1. Fishing occurred primarily on three or four grounds located in the inshore portion of these Areas;
2. The seasonal catch rate declined by 12 % (in seasonal catch rate) in Area 23 and 20% in Area 24;
3. Biomass cannot be estimated from the first annual research trawl survey because of uncertainties surrounding the application of this methodology. The survey covered 150 trawl stations between May 15 and June 11, 1997;
4. At least two more surveys will be required before reliable biomass estimates will be available. The survey indicates that there are good signs of new recruits, particularly in Area 23;
5. There is no scientific basis to indicate that a change is needed in the current level of catch and fishing effort;
6. Fishing effort directed in the offshore regions of Areas 23 and 24 would provide useful information that might help verify the results of the 1997 survey;
7. If high exploitation were the cause of the high incidence of soft crab, then reductions in effort would be necessary to reduce the problem.

Due to a continuous increase in demand for access to the snow crab fishery in eastern Cape Breton, DFO fishery managers requested to Science whether or not any effort (landings at 400 - 450 t level) could be added in Areas 23 and 24. DFO Science examined this request based on the preliminary evaluation of the bottom configuration and depth of traditionally covered fishing grounds and outer zones (within the snow crab fishing area, but not frequently used by traditional fishers).

Fishing Area	Traditional fishing grounds	Outer zone
23	Not suggested (SSR 1998)	To be evaluated
24	Not suggested (SSR 1998)	To be evaluated

However, two issues remained to be clarified i.e.: 1) Where is the traditional fishing zone in Areas 23 and 24?, and 2) How much effort can be put in the outer zones?

In this paper, we discuss the determination of a traditional fishing zone as well as the pros and cons for introducing additional fishing effort in the outer zones of Areas 23 and 24 based on the additional results to those presented at the 1998 RAP meeting.

MATERIALS AND METHODS

Data sources

In 1996 and 1997 (recent data), raw data on fishing effort and fishing location were obtained from the new, single, mandatory paper log used by all fishers for both dockside monitoring and the scientific data base. Copies of the original completed paper logs and the compiled electronic database were obtained from the Statistic Division of the Maritimes Region of the Department of Fisheries and Oceans. All fishers submitted their paper logs, but not all logs were usable. Some of them had one or more missing or erroneous values such as missing number of traps used or impossible fishing location. On average, 75% of the 1,677 logs received were adequately completed.

For 1978 to 1992 (historical data), compiled electronic database and the original completed scientific logs were obtained from Invertebrates Division of the Maritimes Region of the Department of Fisheries and Oceans. The electronic data files summarized the seasonal effort by numbered 5° latitude by 10° longitude grid square (approximately 9.2 by 13.1 km). The coordinates in latitude and longitude of the central point of each square were also given. Log sheet returns as a percentage of all active fishers ranged from 35% in 1981 to 100% in 1978 and 1985 (Tremblay *et al.*, 1994).

At the time this document was prepared the electronic versions of the 1993 to 1995 data were not available for analysis. However, this data has been presented in a comparable manner by Tremblay and Eagles (1996), and show that fishing location and effort were not unusual in any ways for those years when compared with the historical and recent data (as well as being covered by these). This data was therefore omitted from this document.

Fishing location: For both the historical data (1978-1992) and recent data (1996-1997), the geographic distribution of fishing location is presented as a central point within each 5° latitude by 10° longitude grid where any fishing activity had been recorded.

Effort: For Areas 23 and 24, the geographic distribution of fishing effort for the recent data (1996-1997) are presented as a percentage of trap hauls within each 5° latitude by 10° longitude grid; the fishing positions were taken from the logs.

RESULTS AND DISCUSSION

Traditional fishing zone in Areas 23 and 24

There are three issues to be considered when determining the surface of traditional fishing grounds for snow crab 1) unweighted fishing effort distribution (presence/absence of logbook record within a 5° x 10° fishing grid) based on the historical logbook data, 2) weighted fishing effort distribution (fishing frequency-based within a 10° x 10° fishing grid) based on the logbook data, and 3) stock distribution (Biron *et al.*, 1998).

Area 23: The historical distribution of fishing effort revealed that no commercial fishing effort was recorded east of the 58°20' longitude line in Area 23 (Figures 1, 2 and 3). The percentage of fishing effort in relation to the position of the line is summarized in Table 1 for Area 23.

Table 1. Percentage of fishing effort falling in the outer zone of Area 23 based on the logbook data analysis of 1996-1997.

Separation line (Longitude)	Percentage in fishing effort (1996-1997) which falls in the outer zone
58°20'	0.0
58°30'	0.53
58°40'	0.53
58°50'	2.79
59°00'	4.01
59°10'	9.4
59°20'	19.52

The resource distribution based on the trawl survey suggested that the main stock component for Area 23 is distributed inside (west) of the 58°40' longitude line.

The bottom type and configuration of the zone between the east of the 58°40' longitude line and Banquereau Bank is similar to that of the main fishing ground (west of the 58°40' longitude line).

Area 24: The historical distribution of fishing effort revealed that all commercial fishing effort was recorded within a area delimited by the north of 44°10' latitude and east of 61°30' longitude lines (Figures 1, 2 and 4). The percentage of fishing effort for Area 24 in relation to the position of the lines is summarized in Table 2.

Table 2. Percentage of fishing effort falling in the outer zone of Area 24 based on the logbook data analysis of 1996-1997.

	61°30'	61°20'	61°10'	61°00'	60°50	60°40
44°00'	0.00	0.50	1.44	6.93	12.72	25.17
44°10'	0.00	0.50	1.44	6.93	12.72	25.17
44°20'	5.12	5.62	6.56	12.05	17.84	29.82
44°30'	5.46	5.62	6.56	12.05	17.84	29.82
44°40'	9.22	9.38	10.32	15.58	21.00	32.29
44°50'	18.90	18.90	19.61	24.64	28.38	39.01
45°00'	45.75	45.75	45.75	45.75	47.96	56.60

The resource distribution based on the trawl survey suggested that the main stock component for Area 24 seems to continue to distribute towards Sable Island, possibly to the south of 44°00 line. This is mainly due to the fact that the 1997 trawl survey did not cover the south of the 44°10' line towards Sable Island, therefore the stock distribution may be overestimated (we call this occurrence the "Edge Effect"), the model considers that the resource continues to distribute in the area where trawl survey was not conducted. However the bottom type and configuration of the zone south of the 44°00' latitude line is mainly sandy bottom, shallower than 100 m (Sable Island Bank) and appears to be different from that in the main fishing ground (north of 44°00'latitude line). But the eastern portion (east of 61°00' longitude line) of the outer zone seems to be comparable to the inner zone. Higher average bottom water temperatures (4-9°C in July) was recorded in the southwestern part of Area 24 (Drinkwater *et al.*, 1997). Therefore it is reasonable to think that this concentration is not continuous to the south of the 44°00' latitude line. As to the eastern limit of resource concentration the main distribution ends at the 61°20 longitude line.

Problem of using the historical data set (1978-1992): In Areas 23 and 24, the quality of logbook data is quite different depending on the year. Log sheet returns as a percentage of all active fishers ranged from 35% in 1981 to 100% in 1978 and 1985 (Tremblay *et al.*, 1994). It is only since 1996 that an IBQ (Individual Boat Quota) and mandatory logbook were imposed. Therefore the historical data cannot be totally compatible. In fact, fishers started to expand their fishing ground in 1989-90 (Tremblay *et al.*, 1994), as well as to change the type of traps used.

Possibility of introducing additional fishing effort

There is no available knowledge of either snow crab stock-recruitment relationships or long-term impact of the snow crab exploitation of a given concentration (patch) on the neighboring concentrations (patches). When the resource patches are continuous amongst each other, it is reasonable to think that a short-term effect on the neighboring patches may not be negligible. In contrast, if there is no continuity amongst neighboring patches, the impact of exploitation of a given patch on the neighboring patches may be negligible especially on northern Scotian Shelf due to an extremely rugged bottom (Anonymous, 1998).

When considering the exploitation of new grounds, two approaches can be sought; 1) exploiting new ground with a cautious approach by starting with very low fishing effort or 2) exploiting new ground with a high fishing effort by expecting the resource to quickly react to the exploitation. Even if the available biomass is relatively low in the zone in question, the first approach may result in a reasonable catch rate and may take years to provide convincing results to participants for readjustment of catch limit. Whereas the second approach may result in a rapid decline in catch rate or very low catch rate (not commercially supportable level) within the first fishing season. In terms of stock protection, the first approach may not cause an immediate threat to the patches in question, but the second approach may result in a quick and substantial decline of available biomass.

What should be the level of exploitation? Because no trawl survey stations were put in the outer zone, no direct information on the available biomass, levels of fishing effort. However, if comparable catch rate can be expected in the non-traditional grounds compared to the traditional grounds because of the similar bottom configuration and temperature regime it is possible to derive a reasonable catch level for this Area. The level of exploitation in the non-traditional fishing grounds of Area 23 can be based on the evaluation of catch rate/fishable surface in traditional fishing grounds (600 t / 14,400 km^2) applied to the total fishable surface of the non-traditional fishing grounds (7,200 km^2). In this case, fishable surface refers to all grounds found between 100 and 350 meters (Figure 5). Therefore, if the rate of landings / surface of main fishing grounds can be applied to the outer zone, 300 t landings may be possible in Area 23. This level should not be considered as quota or guaranteed landings but a simple target to examine the reaction of stock versus fishing effort. Therefore it may be possible that this target cannot be reached and the fishing in the outer zone may be commercially non-profitable.

In Area 24, not only no trawl survey stations were put in the outer zone, but also the bottom configuration in the southern limit (Sable Island) is quite different (sandy and shallow bottom) from traditional fishing grounds. Although the southwestern part of Area 24 (west of 61°00' longitude line) has a comparable bottom configuration, the bottom temperature is much warmer (4 to 9°C) than the traditional fishing grounds. Furthermore, although the surface covered by the non-traditional grounds is greater than the traditional grounds, the fishable surface remains unknown. However, a similar and additional maximum of 300t in the non-traditional grounds of Area 24 does not seem to represent a conservation risk because of the distance separating the known concentrations found on the traditional grounds and the outer zone. Here again, this level should not be considered as quota or guaranteed landings, if experimental exploitation occurs, but

a simple target to examine the reaction of stock versus fishing effort exercised. Therefore it may be possible that this target cannot be reached and the fishing in the outer zone may be commercially non-profitable.

Is there any immediate threat of larval recruitment due to commercial exploitation in the outer zones? The 1997 trawl survey results showed a high abundance of ovigerous females on the traditionally exploited grounds on the northern Scotian Shelf. Therefore, if the quantity of large males is not substantially reduced within the same zone, no clear threat is foreseen regarding the reproductive capacity within the traditional fishing ground. If the majority of recruits (larvae) come from females living in the outer zones, this argument cannot be supported. Davidson *et al.* (1985) hypothesized that the recruitment to the Eastern Cape Breton fisheries may originate from the Gulf of St. Lawrence stock. However, no conclusive evidence has been provided so far regarding genitors-recruits relationship for any snow crab fishery in eastern Canada. This is the most unknown scientific field of the snow crab life cycle.

What is the safest way to determine the feasibility of the commercial exploitation in the outer zones? Instead of adding fishing effort prior to the direct stock evaluation, DFO Science may conduct a trawl survey in the outer zone prior to the commercial fishing. Then temporary exploitation can be started in the following season if any crab concentration is detected. However, the postponement of experimental fishery may also result in a partial loss of available crab by mortality and by aging of older terminal molt males. Trawl survey results suggested that the main component of offshore portion of Area 23 was newly recruited crab. If the same phenomenon occurs in the outer zone, there is no threat of loosing commercially exploitable biomass due to a high mortality caused by aging. In Area 24 the aging phenomenon is more apparent than in Area 23. If this phenomenon is occurring also in the outer zone of Area 24, the quality of commercial-sized crab may not be as good as fishers expect (mainly composed of mossy crab), which may result in lowering the average price of landed crab. The stock may decline rapidly due to a mortality of older crabs in this Area regardless of the commercial exploitation until new recruitment waves reach the commercial-sized hard shell category.

Once being allowed, can this outer zone exploitation be permanent? As discussed at the 1998 January RAP meeting, a continuous (3-year) trawl survey is necessary to determine the abundance and geographic extension of the resource in any zone on the Scotian Shelf before providing science based advice for setting a reasonable quota level. Depending on the available biomass, there is a possibility of adding more effort to each fishing Area. However, snow crab biomass fluctuates with a 5 - 8 year cycles and no stable exploitation can be expected. In addition, geographic concentration of commercially exploitable crab may change from year to year and in extreme cases fishable biomass may disappear within the traditional fishing zone and the commercial fishing may depend entirely on the outer zone. If any fishable biomass is found in the outer zone, this may be the consequence of the accumulation of adult males over the years. Therefore, in the mean time, the exploitation of the outer zone, if any activity is allowed, has to be considered as temporary and re-examined on an annual basis. In the event of any sign of decline in the stock condition in the outer zone, the exploitation has to be stopped immediately.

Area specific consideration

Area 23: There is a possibility of exercising commercial fishing effort within a determined non-traditional fishing ground. Because no trawl survey stations were put in the outer zone, no additional information is available for setting levels of fishing effort to be put in this zone. If the rate of landings/surface of main fishing grounds can be applied to the outer zone, a maximum 300 t of landings may be possible.

Area 24: Because of a net difference in bottom type and configuration between traditional and non-traditional fishing grounds as well as a high bottom temperature recorded in the southwestern part of the outer zone, it is difficult to apply a quick method to set an experimental fishing effort (target landings). The same level of target landings as Area 23 (maximum 300 t) may be set for Area 24 as a target but there is more uncertainty of being able to reach this level. In such a case, a temporary fishing vessel may not reach its commercial profitability.

General consideration

In order to protect the traditional fishing area from any additional fishing effort increase, temporary fishers in the outer zone, if new permits are issued, should not trespass the boundary. In addition, all information relative to the fishing performance has to be accurately recorded on logbooks. DFO Science staff is ready to have a session with any group of fishers for explaining how to record fishing activities on logbooks. These data should also be crosschecked by on-board observers. The coverage by on-board observers has to be set by fishery managers but Science suggests that at least 50% of vessels be monitored by observers for temporary / exploratory fisheries. In addition to these quality-monitoring systems, there is a possibility for monitoring the fishing vessel activities with a black box (telecommunication device through satellite system). The modality and intensity of monitoring has to be determined between fishery managers and fishing industry.

Monitoring of fishing activities by traditional means (logbook, observers and "black box") is not enough to determine the feasibility of continuous exploitation in the subsequent years. A trawl survey similar to the one conducted in 1997 has to be done in the outer zone commencing in the spring of 1998 to better understand the abundance, geographic distribution of the resource in the area in question.

CONCLUSION

Traditional fishing areas are determined based on the percentage of fishing effort, presence/absence of fishing effort within 5° x 10° grid as well as crab resource distribution. The traditional fishing grounds in Areas 23 and 24 are proposed as follows:

Area	Proposed Borderline	Percentage in fishing effort (1996-1997) in the outer zone
Area 23	58°40' longitude	0.53 %
Area 24	44°00' latitude 61°10' longitude	1.44 %

For setting an **experimental fishery**, the following two scenarios are provided in terms of experimental exploitation in the outer zones depending on the degree of confidence (risk):

1. DFO Science conducts a trawl survey in the outer zones to obtain information on abundance and geographic distribution of the resource. The feasibility of experimental exploitation in the 1999 season will be evaluated to set an appropriate exploitation level.

2. Allow experimental fishing effort (maximum 300 t) in the outer zones in Areas 23 and 24 and conduct a trawl survey prior to the 1999 season, a quick assessment on the stock distribution, abundance as well as fishery performance can be conducted. Science will closely monitor the fishing performance and stock condition through observer and trawl survey projects. The

possibility of maintaining the experimental fishing activity will be evaluated on an annual basis. If any resource problem is detected, the experimental fishing for the following season has to be ceased

Ad hoc eastern Nova Scotia RAP meeting

Following the preparation of this document, a special ad hoc Regional Assessment Process meeting was held in Sydney, Nova Scotia in April 23, 1998. The purpose of this meeting was to consider all scientific information available to establish a limited effort snow crab fishery in the non-traditional fishing grounds of Areas 23 and 24. Because the outcome of this meeting is directly tied with the present document, the resulting document prepared during the RAP session is presented as an Appendix of the present research document.

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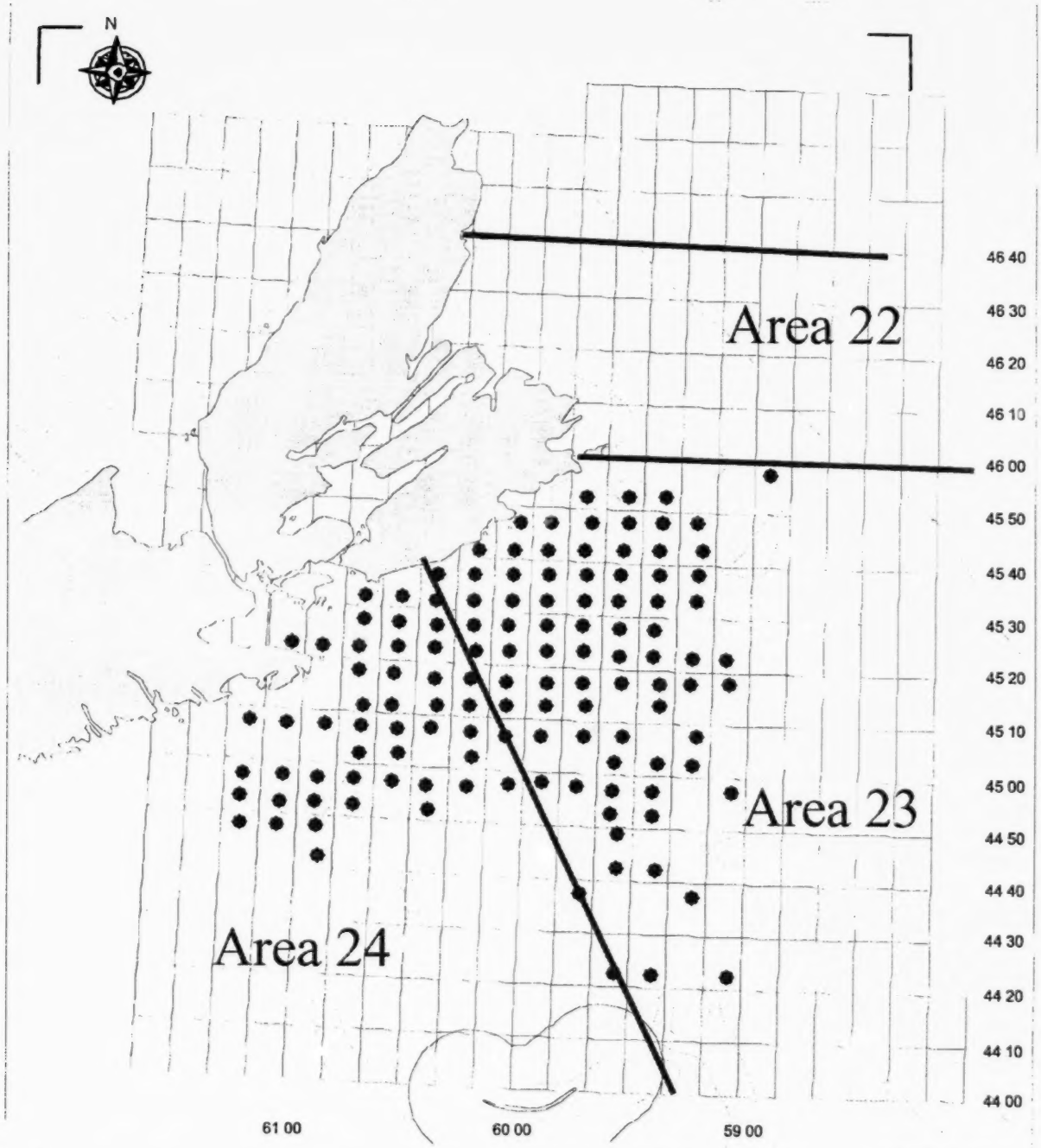


Figure 1. Historical fishing locations based on logbook records (1978-1992).

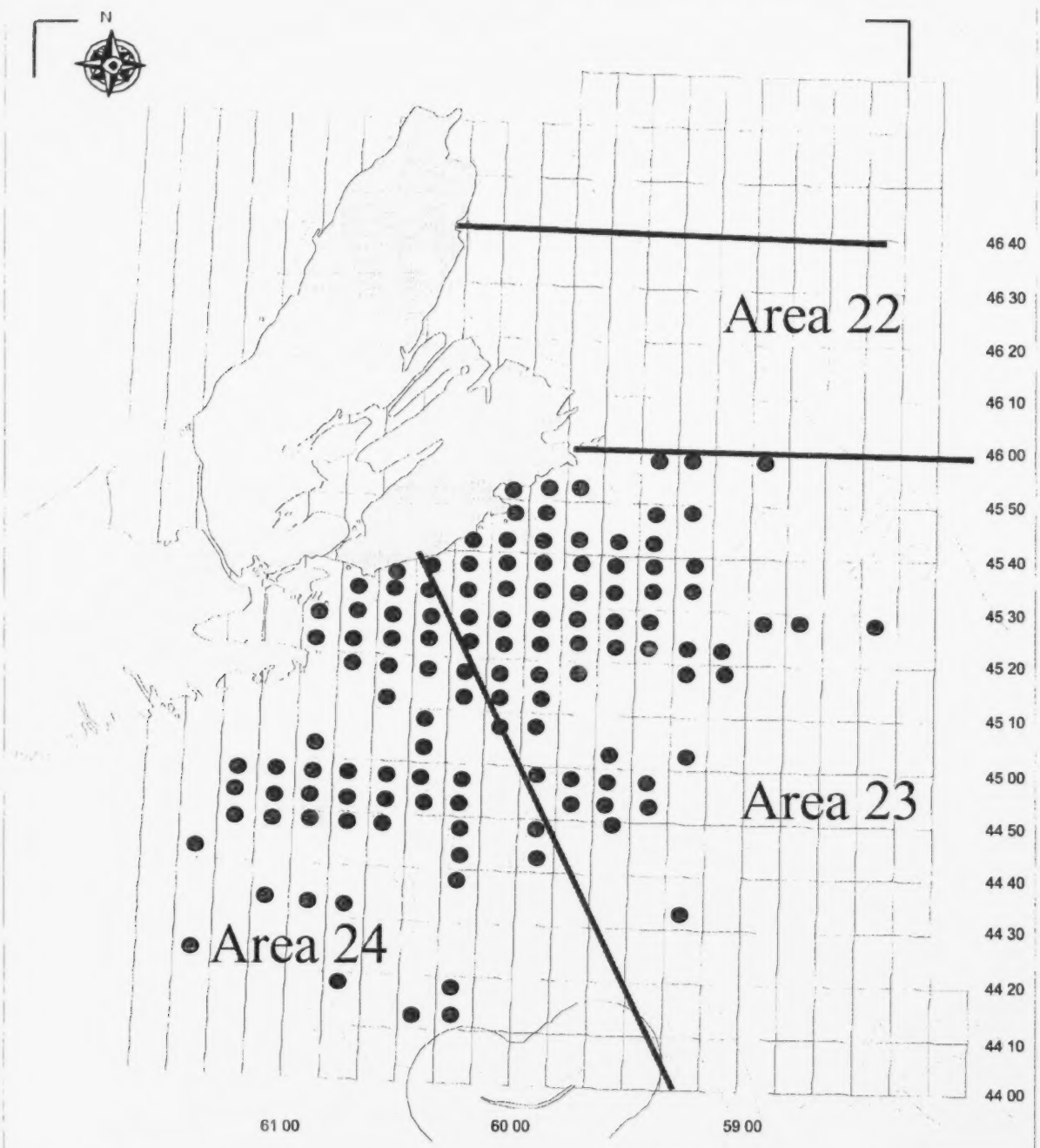


Figure 2. Recent fishing locations based on logbook records (1996-1997).

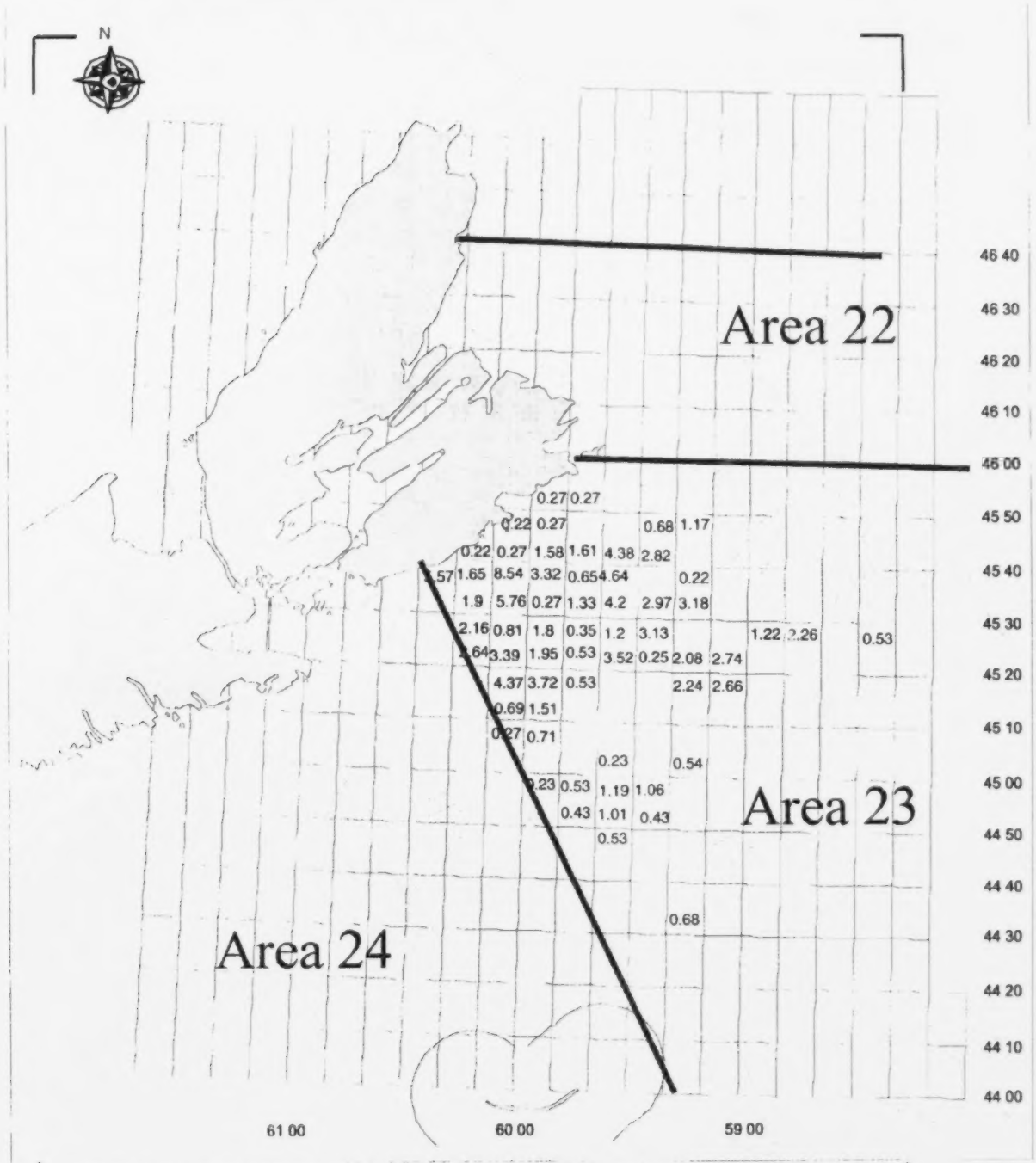


Figure 3. Percentage of effort from 1996 - 1997 logbooks in Area 23.

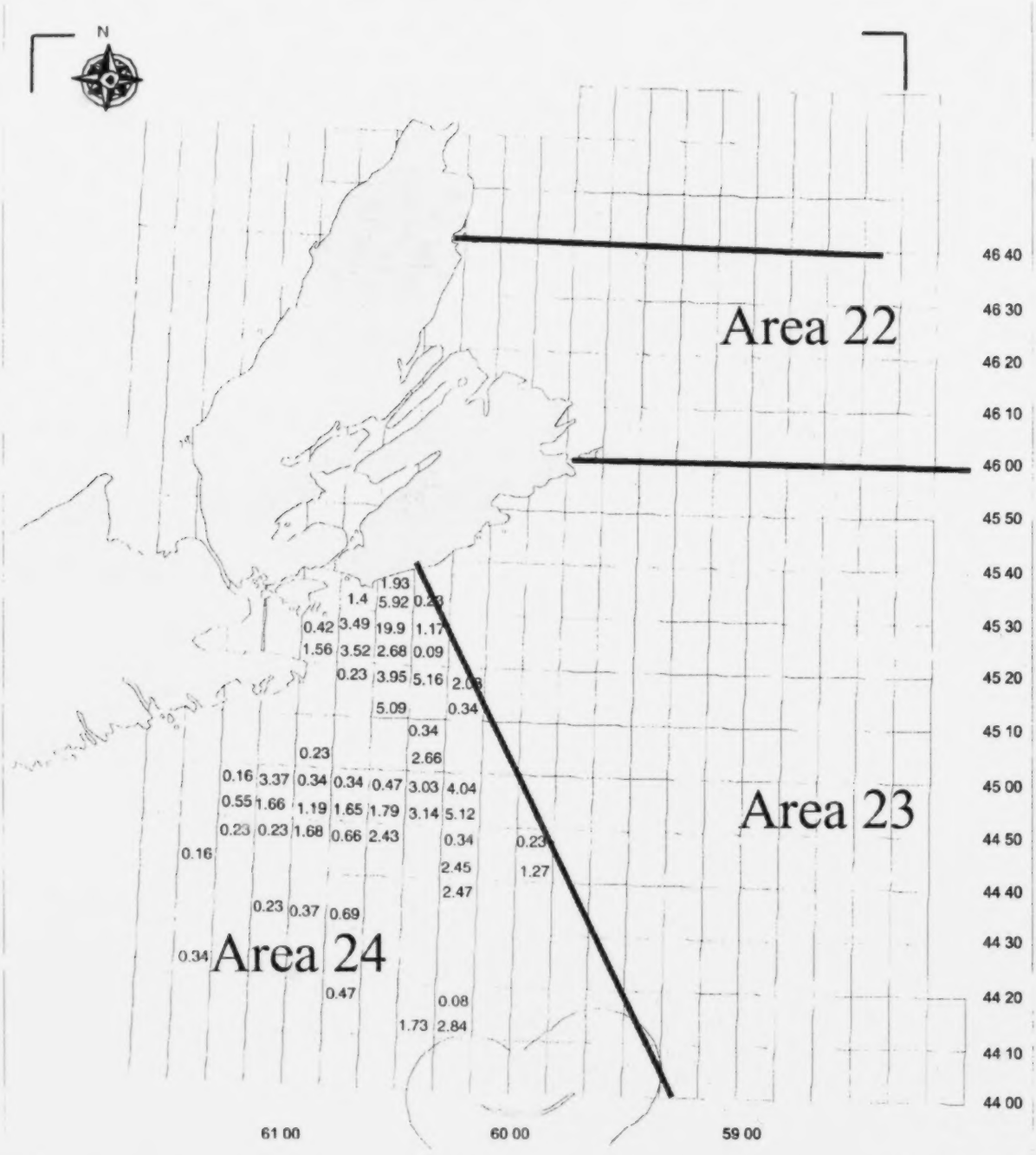


Figure 4. Percentage of effort from 1996 - 1997 logbooks in Area 24.

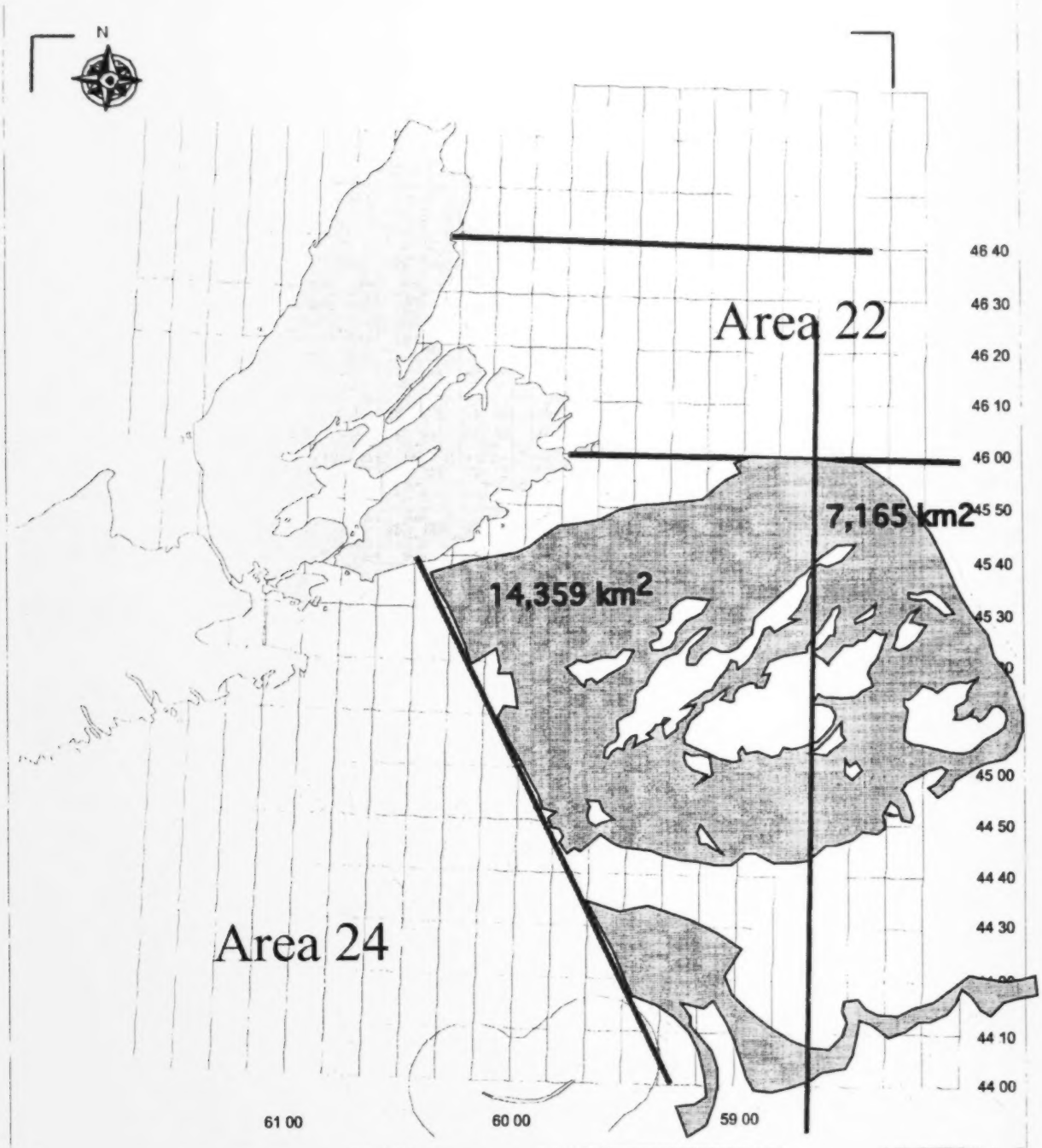
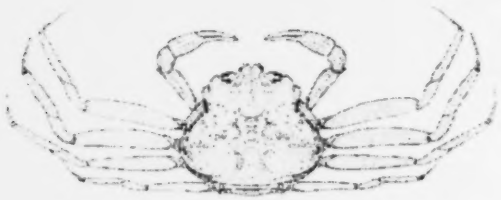


Figure 5. Graphic representation of fishable surface in Area 23.

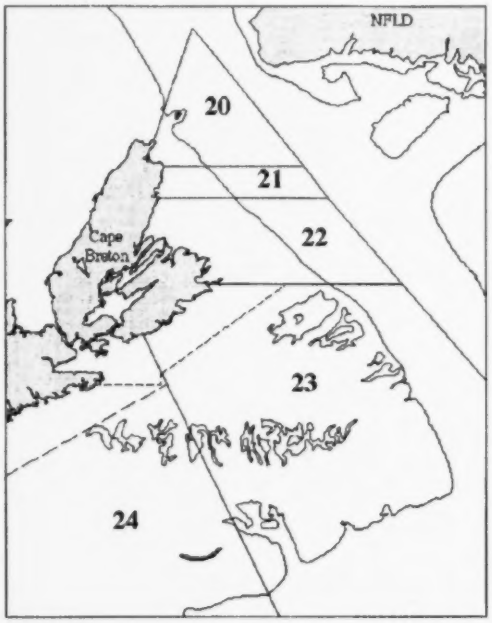


Limited Effort Snow Crab Fishery in the Non-traditional Grounds of CFAs 23 and 24

Background

From 1982 to 1993, management of these fisheries was strictly based on effort controls (seasons, licenses and trap limits). In 1994-95, restrictions were placed on the landings of soft-shelled crab, and individual boat quotas (IBQ) tied to overall quotas were introduced. In 1996, temporary permits were introduced in CFAs-23 and 24. In 1997, the IBQs of the 22 permanent fishers in CFA-23 and the 21 permanent fishers in CFA-24 was lowered from 55,000 lbs to 52,000 in order to bring the four First Nations allocations (introduced in 1996) to full quotas status while allocating quotas to more temporary permits (six permits of 10,000 lbs in each of these two Areas) without increasing effort over that of the past two years.

The resource was assessed in January 1998 and the following conclusions are made: there was a decline in catch rates in 1997 for the traditional fleets in CFAs 23 and 24; there should be no additional effort in the traditional fishing grounds in 1998; and there was the possibility of directing fishing effort into non-traditional grounds.



Summary

- Traditional and non-traditional fishing grounds in CFAs 23 and 24 were identified for the 1998 fishery.
- The area of the non-traditional offshore grounds is about 50% the size of the traditional grounds.
- An additional catch up to 250t in each of the non-traditional grounds of CFAs 23 and 24 does not represent a conservation risk.
- There were no reasons for recommending any changes to the fisheries on the traditional grounds.

The Issue

In April 1998 DFO Fisheries Management requested a response to two questions:

1. What could be the impact of permitting an additional 450t in each of CFAs 23 and 24. In response to this question, two issues were examined:
   - The definition of traditional grounds, and the non-traditional grounds, and
   - The amount of fishing effort that could be added to the non-traditional grounds.
2. What areas should be protected from any new harvest?

Definition of Traditional and Non-Traditional Fishing Grounds

The non-traditional grounds were identified by first locating the traditional grounds through examination of logbooks and through discussions with the industry. The logbooks from 1978-1992 showed similar distributions. The logbooks from 1993-95 suggested that the effort was further offshore. This trend was evident, as well, in the review of the 1996-97 logbooks. Logbooks provide only a crude indication of the actual location of fishing grounds because:

- Fishing lines could extend for many miles beyond the location of the first trap.
- The traditional fishery has moved its fishing location throughout the time period of the fishery.

In spite of these issues, the 1996-97 logbook data were felt to be suitable to define traditional and non-traditional grounds for the 1998 management plan.

A 1998 fishery in the non-traditional grounds would provide confirmation of abundance of crab in offshore areas and any potential for expansion into these areas.

Potential boundaries for the traditional grounds in Area 23 include:

- Eastern boundary at 58∫.40; There would be 14,000 km^2 of fishing grounds inside this line, all waters deeper than 100 meters, and 7,000 km^2 of grounds outside this line. (Science Branch proposal)
- Modified line: 58∫.20' to 44 ∫50', then 58∫40' south ,
- Taking the line proposed by Science on the eastern edge, then an oblique line at ninety miles 45∫50' down to boundary with Area 24,
- Include another boundary south of the boundary between Areas 22 and 23 south to 45∫50',
- Modify the Science proposal to include a square bounded by 59∫00' and 44∫50'. The proposed Science boundaries indicated that 31 of 35 boxes show no fishing effort.
- 80 mile line.

Each of these proposals had particular issues associated with them, therefore, a boundary between traditional and non-traditional grounds was chosen as a compromise of the six options presented above (Fig. 1).

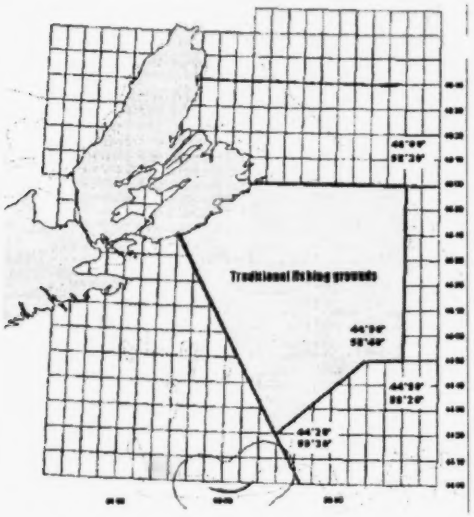


Figure 1. Area 23 fishing grounds.

Potential boundaries for the traditional grounds in Area 24, include:

- A southern boundary at 44∫00' and western boundary at 61∫10' (Science Branch proposal).
- A southern boundary at 44∫10' and western boundary at 61∫10'. The catch and effort in this area needs be defined scientifically (traditional fleet proposal).
- A southern boundary at 44∫20' and western boundary at 61∫10' (non-traditional fleet proposal).

There was no final agreement as to the location of the boundary around the traditional grounds. The two compromise positions of the traditional and non-traditional fleets are indicated on the map attached (Fig. 2).

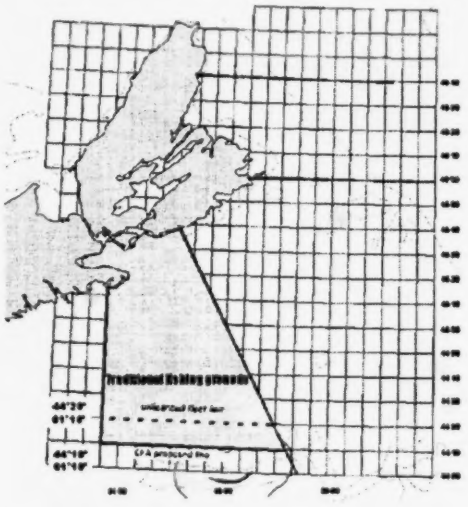


Figure 2. Area 24 fishing grounds.

Impact of permitting an additional 450t

The non-traditional grounds would be available to the traditional and non-traditional fleets, while the traditional grounds are only available to the traditional fleet. Any additional catch and effort should be restricted to the non-traditional fleet operating in the non-traditional grounds.

There was a proposal to divide fishing effort between the two fleets in the non-traditional fishing grounds but this was not supported.

Although the non-traditional fleet in CFA 23 would be restricted to the non-traditional grounds, a cap on the allocation to the non-traditional fleet was needed. There was no agreement as to how much this cap should be, but two points of view were raised.

In CFA 23, the traditional fleet felt that the 450 t for the non-traditional fleet was too high and that 100t was a good starting point

for an exploratory fishery. They appreciated that more scientific information could be gathered from a more intensive fishery and were willing to move up to an upper limit of a TAC of 250 t. The reason for 250t was that it would support 10 vessels, 25t per vessel, 30 traps per boat. It was also noted that the fishery should be organized in a scientific manner to ensure accurate information on catch, effort, location, and characteristics of the catch would be collected.

The majority of the non-traditional fleet was firm on its need for 450t. The reason was that the fishing area for the traditional fleet had been generously defined and that the traditional fleet should have no say on what is caught outside of their traditional fishing grounds. It was also noted that some non-traditional fishers supported a cap of 75t for their 3 boats.

In CFA 24, all parties agreed that there should be a cap on the amount of crab removed from the non-traditional grounds. There was no agreement on the size of this cap. There were also two points of view:

1. The traditional fishers felt that any fishery in the non-traditional grounds must be scientifically based.
2. The non-traditional fleet was firm on its need for 450t for the same reasons described above. It was noted that crab around Sable Island were mostly carapace age of four and may be lost to the fishery in two years.

It was felt that Area 24 had been well explored and the bottoms available for crab were few but this was no reason to prevent potential fisheries from occurring in this area.

There was continuity between the patches of high concentration in Area 24 and they should be considered to represent one patch. Science felt that 250t in CFAs 23 would provide a reasonable start for the 1998 fishery. The area of the non-traditional grounds is about 50% the size of the traditional grounds. Assuming that crab have a similar distribution in both grounds, 250t does not represent a conservation risk in the offshore. This amount would provide enough quota for the non-traditional fleet to be deployed throughout the non-traditional grounds. There is no reason for a different approach in Area 24 and therefore a 250t on these non-traditional grounds is appropriate as well.

There were no reasons for recommending any changes to the fisheries on the traditional grounds.

Management Considerations

These recommendations are for 1998 only and should be re-visited before a 1999 fishery.

The boundaries among the eastern Nova Scotia snow crab fisheries need to be examined in greater detail.

Any new fishing effort must be conducted scientifically with observer monitoring and logbooks that provide accurate information on catch, effort, location of fishing, and biological characteristics of the catch.

A scientific trawl survey throughout all areas would be the best long-term solution to understanding the available yield in this resource.

Reference

Biron, M., E. Wade, P. and M. Moriyasu. 1998. Evaluation of the possibility for effort increase in eastern Nova Scotia snow crab fishing Areas 23 and 24. Can. Stock Assess. Sec. Res. Doc. 98/64.

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